

**OCCUPATIONAL SAFETY
AND HEALTH STANDARDS BOARD**

2520 Venture Oaks Way, Suite 350

Sacramento, CA 95833

(916) 274-5721

FAX (916) 274-5743

Website address www.dir.ca.gov/oshsb**FINAL STATEMENT OF REASONS****CALIFORNIA CODE OF REGULATIONS**

**TITLE 8, Division 1, Chapter 4, Subchapter 14, Article 2, Section 6505,
Article 46, Section 6651, and Article 35, New Section 6625.1 of the
Petroleum Safety Orders, Drilling and Production**

Diesel Engine Runaway Protection

There are no modifications to the information contained in the Initial Statement of Reasons except for the following sufficiently related modifications that are the result of public comments, advisory committee findings and/or Board staff evaluation.

Section 6505. Definitions

A revision is proposed to delete the definition for "Actuation Testing." The term "Actuation Testing" is used in the originally proposed Section 6625.1(c) to establish general testing criteria for diesel engine air intake shutoff devices and required a definition in Section 6505. However, because the revised text in Section 6625.1 does not use the term "Actuation Testing," the revised proposal deletes the definition of "Actuation Testing" as unnecessary.

Section 6625.1. Diesel Engines Runaway Protection

The originally proposed language of subsection (a) has been modified to require "the employer," using diesel engines within 50 feet of the open well bore or other source of ignitable gas or vapor, to comply with subsections (b) through (f). This editorial modification in which the redundant term "diesel engine" is proposed for deletion, is necessary to clarify that it is the employer, not the diesel engine, who must comply with proposed administrative and engineering controls in subsections (b) through (f) when operating diesel engines within 50 feet of the open well bore or other source of ignitable gas or vapor as proposed in Section 6625.1.

A modification is proposed that adds two administrative requirements in subsection (b) and subsection (c) respectively. The modified subsection (b) requires that diesel engines only be operated when the concentration of the flammable gases or vapors is 10% or less of the lower explosive limit (LEL). The modified subsection (c) requires continuous air monitoring at the well bore or at other sources of ignitable gas or vapor to determine if a flammable atmosphere exists at concentrations greater than 10% of the LEL. These proposed modifications are necessary for the safe operation of diesel engines at well sites and are based on an advisory

committee recommendation that a reduced permissible flammable gas and vapor concentration of 10% or less and the requirement for continuous air monitoring at the well bore or other source of flammable gas or vapor would provide the employees sufficient warning and reaction time to shutdown oil and gas well operations and prevent diesel engine runaways as the result of an accidental release of flammable gas and vapor.

The originally proposed language of subsection (b) has been modified and relocated to subsection (d), requiring employers to operate diesel engines under at least one of the conditions outlined in subsections (d)(1) through (d)(4), during operations where the air at the well bore or other source of flammable gas or vapor is not continuously monitored pursuant to subsection (c).

The conditions, originally in subsections (b)(1) through (b)(5), have been modified to limit the engineering controls only to those providing automatic or continuous protection for the diesel engine operation. Therefore, the option of an approved manually controlled diesel engine air intake shut-off valve and the requirement of air monitoring in the areas affecting the safe operation of the diesel engines in the original proposal as a condition in subsection (b)(2) has been deleted from the modified proposal. This is necessary because there would not be sufficient warning and reaction time for an employee to actuate a manual air intake shut-off valve in the absence of continuous air monitoring at the flammable gas and vapor source. Additionally, the modified language in subsection (d)(3), originally in subsection (b)(4), requires an approved system for injecting an inert gas into the engine's cylinders to be automatically actuated. The modification to require an automatic inert gas injection system is necessary because there would be insufficient reaction time for employees to activate a manual inert gas injection system in the absence of continuous air monitoring when an elevated concentration of flammable gas or vapor is encountered. Additionally, the modified language in subsection (d)(3) deletes the air monitoring requirement in the areas affecting the safe operation of the diesel engines. The deletion of this requirement is necessary because it is inconsistent with the modified language in subsection (d) which requires compliance with at least one of the conditions in subsections (d)(1) through (d)(4) where "the air is not continuously monitored." The modified language in subsection (d)(4), originally in subsection (b)(5), adds the requirement that when an employer utilizes another approved method or device to guard against diesel engine runaway, the device must be designed to do so automatically. This is necessary because there would not be sufficient warning and reaction time for an employee to actuate a manual device in the absence of continuous air monitoring at the flammable gas and vapor source.

The originally proposed language in subsection (c)(1) through (3) has been modified and relocated to subsection (e), requiring employers to maintain and test the air intake shut-off valve or emergency shut-off device in accordance with manufacturer's recommendations. The prescriptive language in the originally proposed subsection (c) and the definition of actuation testing in Section 6505 were unclear and could have been interpreted to require a testing protocol that is damaging to the diesel engine and other vehicular systems. Therefore, the modified language in the proposed subsection (e) is necessary to insure that testing of AISV and emergency shut-off devices used to comply with proposed Section 6625.1 is consistent with manufacturer's recommendations. The added requirement in subsection (e) for maintenance to

be consistent with manufacturer's recommendations is necessary to ensure that the AISV and emergency shut-off device used to comply with proposed Section 6625.1 are kept in proper operational condition as intended by the manufacturer. The originally proposed language in subsection (c)(4) requirement for recordkeeping pursuant to Section 3203(b)(1) has been deleted as duplicative. The inspection and testing of the AISV and emergency shut-off devices are subject to requirements in Section 3203(b)(1) and therefore the originally proposed requirement is not necessary.

Section 6651. Loading and Unloading Operations

The originally proposed language of subsection (d) has been deleted as unnecessary because the operation of diesel powered tank trucks and vacuum trucks would already be regulated by the proposed Section 6625.1 at oil and gas well sites regulated under Subchapter 14. The modification of the proposal, not to amend Section 6651 is necessary because the originally proposed requirement for tank truck or vacuum truck diesel engines or auxiliary diesel engines to comply with Section 6625.1 would create a duplicative standard.

Summary and Response to Oral and Written Comments:

I. Written Comments

Mr. David Y. Shiraishi, MPH, Area Director, United State Department of Labor, Occupational Safety and Health Administration, Oakland Area Office, by letter dated October 6, 2011.

Comment:

Mr. Shiraishi stated that based on Region IX, Federal OSHA's review of the proposal, it appears to be commensurate with federal standards.

Response:

The Board acknowledges federal OSHA's findings of being commensurate with federal standards for this issue.

Mr. David Y. Shiraishi, MPH, Area Director, United State Department of Labor, Occupational Safety and Health Administration, Oakland Area Office, by letter dated October 14, 2011.

Comment:

Mr. Shiraishi indicated that federal OSHA withdrew its determination of the proposal appearing to be commensurate with federal standards.

Response:

The Board spoke with Mr. Shiraishi to gain clarity regarding federal OSHA's determination and was told that he (Mr. Shiraishi) was so directed pending further review of the proposal. Board staff notes that federal OSHA does not have a comparable standard.

Kenny Jordan, Executive Director, Association of Energy Service Companies (AESC), by letter dated November 14, 2011.

Comment No. 1:

Mr. Jordan stated that the cost of compliance would be significant and that the added cost of mandated automatic air intake shutoff valve installation would have to be borne by industry.

Response:

The Board agrees that the proposed requirement for the installation of automatic diesel engine air intake shutoff valves would result in considerable cost impact to California businesses. As a result of this and other concerns, the proposal was amended to also provide effective alternative means to protect employees from hazards associated with diesel engine runaways. Employers choosing to install automatic air intake shut-off valves (AISV) would incur costs to comply with this proposal; however, for those employers relying on alternative means and methods provided in the revised proposal, there would be no added cost associated with compliance.

Comment No. 2:

Mr. Jordan noted that the requirement for testing is unclear.

Response:

The Board notes that the testing requirement in the proposal contained prescriptive elements that could have been misconstrued and would have been contrary to manufacturer's recommendations. Therefore, these requirements have been modified to mandate testing of AISV to be consistent with manufacturer's recommendations.

Comment No. 3:

Mr. Jordan expressed concern that the original petitioner in this case is an employee of a company that stands to benefit financially from this new regulation.

Response:

The Board notes that conflict of interest issues are also of concern to the Board. The Board feels that the transparency of the rulemaking process, where the public and the affected stakeholders are made aware of the fact that the Petitioner's employer is a manufacturer of the devices and where the public and the affected stakeholders are given the opportunity to participate in the shaping of the proposal per the Administrative Procedures Act remedy any such concerns.

Comment No. 4:

Mr. Jordan noted other effective methods to mitigate the occurrence of a runaway engine, including monitoring, best practices on location, and the use of risk based assessments and

programs implemented under a continuing and effective accident prevention program currently required by Title 8. He stated that the American Petroleum Institute (API) has provided significant guidance on this issue to industry and supports alternative approaches to the control of runaway diesel engines.

Mr. Jordan included passages authored by Jack Gerard of the API where he stated that diesel operations are safely operated in hazardous environments through implementation of company safety management systems and compliance with all applicable government and industry standards. Mr. Gerard stated that the oil and natural gas industry is already highly regulated through process safety management standards and the Environmental Protection Agency Risk Management Plan and other local jurisdiction laws. API, ASME and others play a significant role in controlling site hazards. Mr. Gerard added that it is more prudent to allow industry to use a performance-based risk-based approach that allows the facility to evaluate their hazards and identify the best tools to mitigate the hazard. Mr. Gerard identified five tools that could be used to control the runaway diesel engine hazard which include but are not limited to: traffic and site personnel access limitations, idling prohibitions and positioning vehicles upwind of vapor source and prohibiting diesel engine operations during alarm conditions. Mr. Gerard emphasized the importance of not reacting to a release after it has occurred but to take steps to prevent the release from a source in the first place, and for the industry's site operations to focus on those sources with the greatest chance for a hazardous release. Consequently, Mr. Gerard and the API conclude that the mandatory use of diesel overrun devices is not necessary, and will result in little or no reduction for a vapor cloud explosion. Mr. Gerard also stated that as the various API standards such as RP 2210, RP 2001 and RP 54 come up for regular review the use of automatically operating diesel overrun devices can be considered for use and mentioned in these standards by the API Safety committee.

Response:

The Board concurs with Mr. Gerard's comments to the extent that use of a performance-based, risk-based approach to control potential vapor sources on a given oil and gas well site appears to be the best approach to mitigating the overrun hazard described by Mr. Bhalla in his petition. This coupled with existing state and federal standards, some of which are administered and enforced by various local jurisdictions, ensures the hazard of uncontrolled vapor source ignition at oil and gas well sites will be controlled.

Therefore, alternative means and methods have been added, including continuous air monitoring to determine if a flammable atmosphere exists and lowering the flammable gas or vapor concentrations from "greater than 20%," pursuant to Section 6521(b), to "greater than 10%" of the lower explosive limit in locations within 50 feet from the well bore or other sources of flammable gas or vapor where diesel engines cannot be operated. The Board believes that the revised proposal provides employers with alternative administrative and engineering controls that effectively protect their employees from hazards associated with runaway diesel engines. The Petitioner is encouraged to present his device for consideration by the appropriate NFPA, API and ASME committees for consideration.

Comment No. 5:

AESC proposes additional discussions for input and conclusions that would involve stakeholders directly impacted by these rules and regulations.

Response:

The Board agrees that continued dialog between stakeholders via the advisory committee process would be advisable. Therefore, Board staff convened an advisory subcommittee on April 3, 2012, which resulted in proposed modifications.

The Board thanks Mr. Jordan, for his comments and participation in Board's rulemaking process.

Doug Van Allen, Sr. HS&E Supervisor, Baker Hughes Inc. (BHI) / Pressure Pumping, by letter dated November 16, 2011.

Comment No. 1:

Installing the emergency shutdowns on mobile and highway vehicles causes great concern to BHI. Engine over-revving could trip the automatic AISV and shut down the vehicles while in traffic and create a traffic hazard that could cause serious accidents. Such over-revving could be caused by such common occurrences as the driver shifting and missing a gear or while using the engine as speed control when descending a long grade.

Response:

Board staff research indicates that unintentionally activated AISV are not an inherent shortcoming of this type of device, but instead, indicates a problem with calibration or control module failure. However, when this occurs, the vehicle would still continue to travel down the road as power to the engine is disrupted, allowing the vehicle operator to coast to a stop along the roadside. Board staff does not believe this comment warrants a change to the proposal.

Comment No. 2:

The driver could lose control of his vehicle, while moving, due to the loss of his power steering and/or power brakes should the automatic AISV inadvertently shut down the diesel engine of the on-road vehicle.

Response:

The Board notes that the sudden loss of power steering would result in loss of control of the vehicle thus subjecting the operator and the public to danger. However, as noted in the response to Comment No. 1, unintentionally activated diesel engine's AISV is not an inherent shortcoming of this type of device but instead indicates a problem with calibration or control module failure. Board staff found no evidence of such failures in diesel powered automotive vehicles now commonly equipped with AISV. Board staff does not believe this comment warrants a change to the proposal.

Comment No. 3:

The proposal could conflict with current California Air Resources Board (CARB) regulations. CARB may not permit after-market additions to on-road vehicles because of the AISV interference with mandated smog checks and CARB mandated diesel particulate trap on the exhaust system.

Response:

Board staff reviewed Vehicle Code Sections 27156, 38390 and 38391, which contains the California anti-tampering law. Board staff notes that these Vehicle Code sections require the after-market parts manufacturer to submit an application for exemption and the necessary documentation to CARB before any add-on part can be sold in California to show that its device does not alter engine emissions. Board staff contacted CARB to determine the applicability of this section to the proposed AISV on diesel engines. CARB responded by stating that CARB had not issued any exemptions for AISV, nor had any applications for exemption for AISV been received by CARB. However, based on a review of currently available AISV, CARB ruled that there is no anticipated adverse effect on emissions resulting from their installation on diesel engines. CARB stated that it will not require manufacturers to request exemption for AISV installed on diesel vehicles and engines operated in proximity of open head wells per the proposed regulation, provided that they are not activated during normal operating conditions of the vehicles and engines upon which they are installed or operated on vehicles operating on California highways that impact emission control efficiency. Therefore, Board staff feels the CARB ruling addresses Mr. Van Allen's concerns regarding the proposal conflicting with CARB regulations.

Comment No. 4:

The proposed AISV testing requirement may cause both engine damage and damage to the rubber boots that connect the AISV to the engine's air-intake manifold because of the excessive negative pressure created by shutting the air-intake off while the diesel engine undergoes dynamic testing (placing a vacuum on the air intake side of the engine). This causes engine oil to be pulled into the combustion chamber past the piston rings, valve seals, blower seals and turbo seals. Mr. Van Allen notes that new CARB approved engines must be equipped with exhaust particulate traps and the Petitioner's device could cause these traps to plug up thus voiding their warranty.

Response:

Board staff agrees with Mr. Van Allen that dynamic testing of the AISV, in some cases, could cause damage to the diesel engine and other vehicular systems. In reviewing the AISV testing protocols recommended by the different manufacturers, Board staff found that the recommendations ranged from conducting the test while the diesel engines operate at a reduced runaway speed to recommending static testing only. Therefore, the testing requirements have been modified to require testing of AISV consistent with manufacturer's recommendations. This should help to ensure that the particulate trap systems mandated by CARB will not be damaged and the warranty voided.

Comment No. 5:

The proposal would have significant economic impact on business because of the cost of installation of the newly mandated automatic AISV and encouraged the Board to review the proposal further and provide a more accurate cost analysis.

Response:

The Board understands Mr. Van Allen's concern and agrees that compliance with the requirement for the installation of automatic diesel engine AISV on all diesel engines within 50 feet of the well bore or other source of flammable gas or vapor would result in considerable cost impact to California businesses. As a result of these concerns and the fact that other effective means to control diesel engines are available, the proposal was amended to include alternative means to control diesel engine runaway that have a proven track record of effectively protecting employees.

The Board thanks Mr. Van Allen for his comments and participation in the Board's rulemaking process.

Jogen Bhalla, Vice President, AMOT, by letter dated November 7, 2011.

Comment No. 1:

Mr. Bhalla stated that a 50-foot safety zone surrounding the well bore or other source of ignition as required by diesel engine runaway protection in subsections 6625.1(a) and (b) is not consistent with the 100 foot safety zone required in the API standards and therefore does not meet federal OSHA standards. Mr. Bhalla stated that the proposed 50 foot zone is not based on scientific findings and violates API RP 54 and the API RP 500 standards and will not prevent diesel engine runaway disasters.

Response:

The API standards referenced in this discussion do not contain a requirement for a 100-foot safety zone for the operation of diesel engines. The API Recommended Practice for Occupational Safety for Oil and Gas Well Drilling and Servicing Operations, API Recommended Practice 54 Third Edition, August 1999, Reaffirmed, March 2007, requires a 100 foot safety distance for rig generators upwind of the wellhead (Section 9.14.2). Section 9.15.3 requires the use of spark arrestors for all internal combustion engines located within 100 feet of the well bore and does not address automatic ASIV. Section 9.15 addresses internal combustion engines and addresses emergency shut-down devices for diesel engines but with no safety distance specified. Board staff notes that Title 8, Section 6554 in the Petroleum Safety Orders regulating well sites requires emergency stop devices on all stationary internal combustion engines driving air or gas compressors, and Section 6625 mandates for all diesel engines that power drilling and well servicing machinery be equipped with emergency stop devices. Both Sections 6554 and 6625 mandate manually operated shut off valves for the diesel engines irrespective of distance to wells or sources of ignition.

Comment No. 2:

Mr. Bhalla questioned what the scientific basis was for the proposed 50 foot zone.

Response:

The proposed 50-foot safety zone was developed by staff based on stakeholder discussions and a review of Canadian drilling and production standards which mandate varying distances for the safety zone, ranging from 33 feet to 80 feet. British Columbia recently abandoned similar prescriptive standards and adopted a more performance based approach using Class 1 Division 2 or higher hazardous location classification as the determinant for diesel engine runaway controls. Additionally, Board staff reviewed all available empirical data in national and California accident reports to determine a necessity for a 100 or 50-foot safety zone and noted that all accidents related to diesel engine operations at well sites occurred within the immediate vicinity of the well bore, well within 50 feet from the well bore. Board staff concluded that, based on all the evidence, the 50-foot safety zone would provide effective protection from diesel engine runaways. The Board, therefore, made no modifications to the proposal as the result of this comment.

Comment No. 3:

Mr. Bhalla questioned what the possible incremental cost savings to industry would be by changing the safety zone from 100 feet to 50 feet, and if these costs are negligible, why expose workers to the hazards of diesel runaways by reducing the regulated area size?

Response:

The Board did not justify the size of the safety zone on the basis of cost to industry, but on its ability to prevent accidents associated with diesel engine runaways from occurring. Where Board staff could not find reported diesel engine runaway accidents outside the immediate vicinity of the well bores, a necessity could not be shown to require a safety zone greater than 50-foot.

Comment No. 4:

Mr. Bhalla stated that the complexity of compliance with a requirement for a 100-foot safety zone and the inclusion of mobile and vehicular diesel powered equipment as the result of the larger 100-foot safety zone would provide greater safety.

Response:

Board staff agrees with Mr. Bhalla that compliance with a requirement for a 100-foot safety zone might be less complex; however, the necessity for a safety zone greater than 50-foot could not be shown.

The Board thanks Mr. Bhalla for his comment and participation in the Board's rulemaking process.

James Thomas, Administrative & Regulatory Affairs Manager, Nabors Well Services Co. (NWSC), by letter dated November 9, 2011.

Comment No. 1:

Board staff did not provide any unique accident data for California, but proposed modification to the open well bore activities using refinery data from accidents from other states or other countries. Mr. Thomas suggested that the Board staff review the accidents in California at oil and gas well operations to better understand the exposure of runaway diesel engines in California and, if necessary, develop safety standards that reduce the exposures associated with oil and gas well operations.

Response:

The Board disagrees with Mr. Thomas' statement that Board staff did not provide unique accident data for California. The Board notes that the accident data reviewed by the Advisory Committee and Board staff included all reported California accident data. Board notes that staff routinely use national accident data to establish accident trends; however, it relies on California accident data to determine and support the necessity of a rulemaking. The Board directed staff to convene an advisory committee to determine whether a consensus could be reached as to the necessity of the proposal. On April 3, 2012, the advisory subcommittee could reach no consensus on the necessity for the proposal. However, all present agreed that well site safety could be enhanced by a requirement for continuous air monitoring for flammable gas or vapor at the well bore and a requirement that would mandate the shutdown of all operations when flammable gas or vapor concentration is detected above 10% LEL.

Comment No. 2:

Mandating the use of automatic AISV for diesel engines to address the hazards associated with runaways is not necessary. Mr. Thomas recognized that when flammable vapors are released from an open well bore the diesel engine could experience an uncontrolled runaway event. However, Mr. Thomas believed the best way to minimize the risk is to mitigate the release of gas at the source.

Response:

The Board agrees with Mr. Thomas that source control through administrative methods currently practiced with such elements as 1) continuous monitoring, 2) shutdown procedures and controls, and 3) evacuation protocols are effective where correctly implemented. The Board feels that the amended proposal, that includes administrative controls and engineering controls, provides the industry with alternative means to comply with the proposed standards.

Comment No. 3:

NWSC recommends modifying the proposal to allow for the use of a gas monitor that would detect natural gas release from the well bore well below the LEL as an alternative to the proposed requirement for an automatic AISV. Mr. Thomas clarified that, should a release occur, the monitor would record the reading and sound the alarm that would provide early warning for the crews on location to actuate the AISV to shutoff all diesel engines and evacuate the well site. Mr. Thomas stated that the employers could thereby continue using the automatic AISV that are already required in Title 8.

Response:

The Board agrees with Mr. Thomas. The Board has modified the proposal to address the use of combustible/flammable gas/vapor technology. (See Response to Mr. Thomas' Comment No. 2)

Comment No. 4:

Mr. Thomas expressed concern over the requirement for wired remote controls for AISV and stated that the wires could get cut or broken.

Response:

The Board notes that the definition for remote control includes controls that are hardwired in place on diesel powered equipment or rigs at locations other than on the AISV, and that such wired controls would meet the requirement for a remote control in Section 6625.1. The Board notes that the remote controls required on automatic AISV are designed to override the automatic control, and activate the AISV before automatic actuation occurs. Additionally, the Board does not envision the use of pendant type controls where connecting wires could be damaged, however, in the event such controls are developed and used in the future, the issue of damage control must be addressed by the employer.

Comment No. 5:

Mr. Thomas expressed concern about the requirement for wireless remote controls for AISV and stated that the wireless control could interfere with other nearby wireless AISV. He also expressed concern for controlling different AISV systems wirelessly, and use of terms within the proposal that mandate use of an approved or certified AISV device.

Response:

The Board feels that the effectiveness and reliability of AISV raised by Mr. Thomas are addressed by the requirements in Section 6625.1(c)(1) of the proposal, for use of approved AISV, as defined in Section 3206 of the General Industry Safety Orders (GISO). Wireless system frequencies can be selected to avert the possibility of remote controls at one location affecting a diesel engine at another location. It will be the responsibility of the employer to ensure that, regardless of whether there are AISV being used coming from different manufacturers, the wireless remote system will be effective with the AISV component. It is also worth repeating that Section 6625.1(c)(4) allows the employer to use a method or system of his/her own choosing that will perform in a manner to ensure the hazard of diesel overrun is controlled. The term "approved" as used in the modified proposal is already defined in Section 3206 of the GISO, as stated above. The term "certified" is not found in the proposal. Based on the existing Title 8 definition for approved, the Board believes a verification program for the use of AISV is unnecessary. It is up to the discretion of the Division to decide whether they wish to develop a convenient list of approved AISV devices or not.

Comment No. 6:

Mr. Thomas noted that the proposal requires a weekly test of the AISV by a qualified person and suggested that the testing be performed by site crews. He also asked what are the qualifications

of a “qualified person” and will that person have to be specially trained. Mr. Thomas asked if the actuation test will be required for AISV not operated within 50 feet of the well bore.

Response:

The definition of “qualified person” is contained in Section 6505 of the Petroleum Safety Orders-Drilling and Production and states explicitly what those qualifications are. The Board agrees with Mr. Thomas’ suggestion to place the test responsibility in the hands of site crews provided they are qualified per the Section 6505 definition to handle this responsibility competently. The proposal requires AISV to be maintained and tested in accordance with the manufacturer’s recommendations; therefore the employer must ensure that the qualified person is competent in the manufacturer’s test protocol and follows it accordingly. As far as an actuation test for vehicles operated outside the 50 foot safety zone, the short response would be generally not but that will largely depend on site specific operations, the nature of those operations and whether diesel equipment using those devices might be operated within the safety zone in which case they would need to be tested.

Comment No. 7:

Mr. Thomas expressed concern about the requirement for AISV possibly interfering with smog test and DMV inspection requirements in California.

Response:

CARB reviewed the AISV and their application and ruled that there is no anticipated adverse effect on emissions resulting from their installation on diesel engines. Additionally, CARB stated that it will not require manufacturers to request exemptions for AISV installed on diesel vehicles and engines to comply with the anti temper regulations of concern to Mr. Thomas. Therefore, the Board feels that no modification of the proposal is warranted. (See Board’s response to Mr. Van Allen’s Comment No. 3.) Board staff is not aware of any DMV related issues with regard to the installation of diesel overrun devices. Diesel overrun technology has been incorporated in the engine design of a few high end luxury import diesel passenger automobiles for a number of years, such as Mercedes Benz, and staff is not aware of any compliance issues with DMV with regard to the use of this technology in passenger automobiles on public right of ways under the jurisdiction of the DMV.

Comment No. 8:

Similar concerns to Mr. Van Allen’s comment, Mr. Thomas stated that the engine over-revving could trip the automatic AISV and shut down the vehicles while in traffic and create a traffic hazard that could cause serious accidents. Mr. Thomas indicated that such over-revving could be caused by such common occurrences as the driver shifting and missing a gear or while using the engine as speed control when descending a long grade.

Response:

Board staff research indicates that unintentionally activated diesel engine’s air-intake shutoff valves are not an inherent shortcoming of this type of device, but instead, indicates a problem with calibration or control module failure. However, when this occurs, the vehicle would still

continue to travel down the road as power to the engine is disrupted, allowing the vehicle operator to coast to a stop along the roadside. Board staff does not believe this comment warrants a change to the proposal.

Comment No. 9:

Mr. Thomas recommended that Board staff do a detailed cost analysis and financial impact that the requirement for automatic AISV would have on the industry.

Response:

The Board agrees with Mr. Thomas that the financial impact must be considered. During the April 3, 2012, advisory subcommittee meeting, the cost of installing automatic AISV was presented and discussed and it was concluded that the use of automatic AISV would result in considerable cost impact to California businesses. As a result of this and other concerns, the proposal was amended to also provide effective alternative means to protect employees from hazards associated with diesel engine runaways. Employers choosing to install automatic air intake shut-off valves would incur costs to comply with this proposal, however, for those employers relying on alternative means and methods provided in the revised proposal there would be no added cost associated with compliance to the revised proposal. Board staff does not believe this comment warrants a change to the proposal.

The Board thanks Mr. Thomas for his comment and participation in the Board's rulemaking process.

Mr. Victor Esparza, Local 12, Operating Engineers, by letter dated November 17, 2011.

Comment No. 1:

Mr. Esparza stated that he supports the proposal for automatic AISV and feels use of AISV is superior to human activated emergency methods and means since the latter are subject to human error.

Response:

The Board agrees with Mr. Esparza that automatic AISV are effective in preventing diesel engine runaway conditions. However, the Board feels that other effective means are available to control diesel engine runaways that provide employers with reasonable and alternative overspeed controls that provide the necessary flexibility to conduct their operations and provide the necessary worksite safety.

Comment No. 2:

Mr. Esparza recommended the use of ducted combustion air, as proposed in Section 6625.1(b)(3), when stationary diesel engines are used on a long-term basis.

Response No. 2:

The Board agrees with Mr. Esparza that gas and vapor free ducted combustion air would provide effective long-term protection for stationary engines from diesel engine runaways. The Board

notes however that the advisory committee considered the use of ducted air and retained the requirement as written to permit the employer discretion and flexibility based on site specific and operational conditions to use ducted combustion air as the employer deems necessary in the protection of well site employees.

The Board thanks Mr. Esparza for his comment and participation in the rulemaking process.

Mr. Rick Latham, Sub-District Director, United Steel Workers by letter dated October 21, 2011.

Comment No 1:

The industry standard is 100 feet for preventing runaway diesel engine explosions. Dr. Sam Mannan, Texas A and M University, recommends that the proposed standard should not deviate from the 100 foot rule that is specifically required by the API RP 54 and 500 standards.

Response:

The Board notes that, with regard to the API documents and the safety zone distances, a distance requirement is not stated in these documents (see the Board's response to Mr. Jogen Bhalla's Comment No.1). The Board therefore made no modifications to the proposal as the result of this comment.

Comment No 2:

Mr. Latham states that diesel engines are a detonation source, as evidenced by the explosion at the BP Texas City and Deepwater Horizon operations. Many variables contribute to an explosion, temperature, topography, type of flammable/combustible material and wind direction. It cannot be assumed that drivers of diesel powered equipment will know enough to perceive the danger signs, environmental conditions and tendencies that might favor an explosion or detonation; therefore some type of fail-safe, automatic device must be present to prevent diesel engine runaways. For these reasons, Mr. Latham suggests the Board go with a 100 foot safety zone rather than a 50 foot safety zone.

Response:

The Board agrees with Mr. Latham that runaway diesel engines can cause catastrophic events leading to serious injury and death. However, in regard to Mr. Latham's suggestion of a 100 foot safety zone rather than a 50 foot safety zone, the Board notes that all available national and California well site accident data shows that all accidents related to diesel engine operations at well sites occurred within the immediate vicinity of the well bore and well within the proposed safety zone. The Board also notes that the April 3, 2012, subcommittee yielded no additional documentary evidence or basis that would persuade the Board or its staff that further modifications as suggested by Mr. Latham are necessary. Consequently, the Board believes no modification to the proposed 50-foot safety zone is justified.

Comment No 3:

Mr. Latham asked the Board what diesel engines would be left unprotected by the proposed 50-foot safety zone, as opposed to adopting a 100-foot safety zone?

Response:

The Board notes that there are numerous standards that would regulate diesel engines outside the 50-foot safety zone including: 1) GISO Section 3203 requiring the assessment and control of hazards, including those presented by the operation of diesel engines at environments where flammable gasses and vapors may be released; 2) GISO Section 5416(c) prohibiting sources of ignition in any outdoor locations where the concentration of the flammable gases or vapors exceeds or may reasonably be expected to exceed 25 percent of the LEL (this section mandates repeated or continuous monitoring while the source of ignition is present); 3) Title 8, Section 6521(a) requiring air monitoring or testing to determine the presence of a flammable atmosphere before a source of ignition is used in locations where flammable gases or vapors are likely; 4) Section 6521(b) mandating that no source of ignition shall be permitted in an area where the content of flammable vapors or gases is greater than 20 percent LEL; 5) Section 6524 mandating that flammable waste vapors or gases be burned or controlled to prevent hazardous concentrations reaching sources of ignition or otherwise endangering employees; 6) Section 6631 mandating tests for the presence of flammable or toxic vapors or gases to be made with approved devices or apparatus or by chemical analysis, and conducted by qualified persons; 7) Section 6619(b) mandating establishment and implementation of an evacuation plan to ensure the safe and orderly evacuation of employees in accordance with GISO Section 3220; 8) GISO Section 3511 requiring engines that are not manually throttled to be equipped with an effective governor which will automatically control the speed of the engine under varied loads; 9) Section 6554 requiring emergency stop devices on all stationary internal combustion engines driving air or gas compressors, irrespective of distance to wells or sources of ignition; 10) Section 6625, mandating that all diesel engines that power drilling and well servicing machinery be equipped with emergency stop devices. The controls of the emergency stop devices must be painted red or otherwise made conspicuous and be located at the driller's console. Board staff does not believe this comment warrants a change to the proposal.

Comment No 4:

Mr. Latham questioned what the technical basis was for the proposed 50-foot safety zone.

Response:

The proposed 50-foot safety zone was developed by staff based on stakeholder discussions and a review of Canadian drilling and production standards which mandate varying distances for the safety zone, ranging from 33 feet to 80 feet. British Columbia recently abandoned similar prescriptive standards and adopted a more performance based approach using Class 1 Division 2 or higher hazardous location classification as the determinant for diesel engine runaway controls. Additionally, Board staff reviewed all available empirical data in national and California accident reports and based on that, to determine a necessity for a 100 or 50-foot safety zone, noted that all accidents related to diesel engine operations at well sites occurred within the immediate vicinity of the well bore within 50 feet from the well bore. Board staff concluded that, based on all the evidence, the 50-foot safety zone would provide effective protection from diesel engine runaways. The Board, therefore, made no modifications to the proposal as the result of this comment.

Comment No 5:

Mr. Latham noted that, if cost of changing the safety zone from 100 feet to 50 feet are negligible, why expose the workers to the hazards of diesel runaways by reducing the regulated area size?

Response:

The Board did not justify the size of the safety zone on the basis of cost to industry, but on its ability to prevent accidents associated with diesel engine runaways from occurring. Where Board staff could not find reported diesel engine runaway accidents outside the immediate vicinity of the well bores, a necessity could not be shown to require a safety zone greater than 50-foot. The Board, therefore, made no modifications to the proposal as the result of this comment.

Comment No. 5:

It is our understanding that Cal OSHA must have minimum standards that meet fed OSHA standards, which follow API standards for compliance and citations. Therefore, the 50 foot standard does not meet OSHA standards.

Response:

As stated in the response to Mr. Bhalla's Comment No. 1, there is no 100 foot requirement in any of the API standards mandating the use of an automatically operating diesel overrun shut off device. There is no federal OSHA standard that specifically requires the use of an AISV at 100 feet unless federal OSHA is enforcing such a requirement under its general duty clause. Even if that were the case, the California Labor Code only requires California to promulgate standards that are comparable or commensurate with fed OSHA for all occupational safety and health issues that fed OSHA promulgated.

The Board thanks Mr. Latham for his comment and participation in the Board's rulemaking process.

Fred S. Holmes, President, Holmes Western Oil Corporation, by letter dated November 4, 2011.

Comment:

Mr. Holmes stated that during the 65 years that Western Well Service and Western Drilling was in business, they never "had a diesel engine run on uncontrolled natural gas," and he believes the diesel air intake automated shut-off device is unnecessary. Additionally, Mr. Holmes stated that he is aware of only one such event in the 1940s on natural gas in Avenal, California.

Response:

The Board agrees that, as Mr. Holmes implies, the occurrence of diesel engine runaways is in large controlled by safe practices in the oil and gas well industry; however, where employers are not actively enforcing industry endorsed well site safety rules, the diesel engine runaways have occurred. As a result of these and similar concerns and the fact that other effective means to control diesel engines are available, the proposal was amended to include alternative means to control diesel engine runaway that have a proven track record of effectively protecting

employees, including current industry wide safe practices that have shown to be effective in controlling diesel engine runaways.

The Board thanks Mr. Holmes for his comment and participation in the rulemaking process.

II. Oral Comments

Oral comments received at the November 17, 2011, Public Hearing in Sacramento, California.

The following speakers oppose the proposal primarily for the following reasons: (1) there are already administrative controls in place in California to prevent diesel engine runaway explosions; (2) California Air Resources Board (CARB) does not permit any after-market additions to on-road diesel engines-- any such additions will cause the vehicle to fail an emissions test; (3) there is not sufficient accident data in California to justify such a regulation; and (4) the cost of compliance would be significant:

- Doug Van Allen of Baker Hughes
- James Thomas of Nabors Well Services
- Mike George of Key Energy Services
- Jim Zaben of Kings Oil Tools
- Tim Maples of National Oil Well
- George Harmer of General Production Services

The following speakers support the proposal, although they would recommend modifying the 50-foot safety zone to be commensurate with the API recommended 100-foot area regarding spark arrestors:

- Russ Haddadin of AMOT
- Jogen Bhalla of AMOT
- Rick Latham of United Steelworkers (USW)

The following speakers support the proposal because it promotes worker safety:

- Victor Esparza of Operating Engineers Local 12
- David Simmons of USW Local 675

Response:

The Board has provided response to the comments listed above in the summary and response to written comments (See the response to Jogen Bhalla, Rick Latham, Victor Esparza, James Thomas, and Doug Van Allen.).

Mr. Guy Prescott, Standards Board member

Comment:

Mr. Prescott stated that we should pay attention only to California accident data, as we have numerous other controls, both environmental requirements and safety requirements, in place that other states and countries do not have. He urged Board staff to bring forward a stronger statement regarding necessity. There has not been a diesel runaway problem in California with current monitoring and administrative controls in place.

Mr. Prescott also expressed concern that the advisory committee did not reach consensus to go forward with rulemaking. In addition, the cost estimates are wrong; there are going to be costs associated with this proposal. Finally, the proposal has the potential of putting employers in violation of CARB on-road vehicle regulations.

Mr. Prescott advised staff to talk to CARB to determine if these devices are put on on-road vehicles, they will not violate CARB standards, although it appears that they will. It is not fair to put employers in a Catch-22 position. He does not see any reason at this time for the proposal to go forward.

Response:

The record reflects that Board staff, as directed by the Board, convened a subcommittee of key diesel overrun advisory committee members on April 3, 2012, and was not able to gain consensus for mandating the use of automatic AISV or the use of ASIV for any diesel source at 100 feet as recommended by the petitioners and labor representatives. The California accident data acquired by Board staff and reviewed by the advisory committee show three preventable accidents. Board staff concluded that had the employers involved in the accidents complied with existing safety orders they would have prevented the accidents. The subcommittee determined that there would be serious and adverse cost impact created by a mandate to use automatic AISV on all diesel engines at well sites in California. However, all present at the April 3, 2012, subcommittee meeting agreed that well site safety could be enhanced by a requirement for continuous air monitoring for flammable gas or vapor at the well bore and a requirement that would require the shutdown of all operations when flammable gas or vapor concentration is detected at or above 10% LEL, as an alternative to installing automatic AISV on all diesel engines.

Regarding Mr. Prescott's comments about CARB, see the response to Mr. Van Allen's Comment No. 3.

Mr. Bill Jackson, OSH Standards Board member

Comment:

Mr. Jackson agreed with Mr. Prescott. He stated that there has not been a clear demonstration of necessity for the proposal. It appears that the advisory committee was presented with a proposed regulation rather than being asked whether there was a need for a regulation.

Response:

California accident data for the last 21 years (1/1990 to 1/2011) showed three oil and gas well site accidents. It appears to Board staff that, if existing regulations had been fully complied with, these accidents would likely not have occurred. During the April 3, 2012, subcommittee meeting no consensus was reached as to the necessity for the proposal to require automatic AISV on all diesel engines located within 50 feet from the well bore or other source of flammable gas or vapor and whether the safety zone should be 100-foot (petitioner) or 50-foot safety zone (Board staff). However, all present agreed that well site safety could be enhanced by a requirement for continuous air monitoring for flammable gas or vapor at the well bore and a requirement that would require the shutdown of all operations when flammable gas or vapor is detected at or above 10% LEL. Accident data upholds the prudence and necessity for a 50 foot zone and AISV use given that the California accident data indicates that incidents occur within the 50 foot zone distance rather than 100 foot zone. Consequently, a 100 foot distance cannot be upheld based on California accident data. Also, use of the AISV on a mandated basis was vehemently opposed by industry given their outstanding investment and implementation in the performance-based, risk-based methods they use in conjunction with other relevant state, federal and local standards. The industry safety record supported the notion that risk-based performance standards used by the industry as described in the letter from Mr. Gerard have been effective without having to mandate use of Mr. Bhalla's device.

John MacLeod, OSHSB Chairman

Comment:

Mr. MacLeod inquired about consensus at the advisory committee and stated that it appeared that there was little or no accident data in California related to diesel engine runaways.

Response:

Please see the responses to comments by Mr. Jackson, Mr. Thomas and Mr. Latham.

MODIFICATIONS AND RESPONSE TO COMMENTS RESULTING FROM
THE 15-DAY NOTICE OF PROPOSED MODIFICATIONS

As a result of written comments regarding the proposed modifications contained in the 15-Day Notice of Proposed Modifications mailed on August 3, 2012, the following sufficiently related, non-substantive modification has been made to the Informative Digest published in the California Regulatory Notice Register dated September 30, 2011.

Section 6505. Definitions

A revision is proposed to amend the definition for "Runaway" by adding the words "per minute" after the word "revolutions." This non-substantive modification is necessary for clarity and to correctly state the rotational speed of the diesel engine as used in the definition.

SUMMARY AND RESPONSES TO WRITTEN COMMENTS

Jogen Bhalla, Vice President, AMOT, by letter dated August 20, 2012.

Comment No 1:

Mr. Bhalla recommended adding language to the proposed definition of “Runaway” that also addresses the issue of runaway conditions caused by diesel engine malfunction.

Response:

The Board disagrees with Mr. Bhalla, in that the regulatory text using the term “runaway” does not involve runaway conditions caused by malfunctioning engines. Because the regulatory text only concerns the overspeeding of the diesel engine resulting from the aspiration of ambient concentrations of flammable gasses or vapor into the air intake of the engine, the inclusion of other causes of runaways is not necessary and may add confusion. However, the Board notes Mr. Bhalla’s correct use of terminology describing the rotational speed of the diesel engine in his proposal. The Board has therefore only modified the proposed definition of “Runaway” by using the phrase “revolutions per minute” instead of “revolutions” without the addition of the issue of malfunctioning of diesel engines as recommended by Mr. Bhalla.

Comment 2:

Mr. Bhalla felt that the proposed language in the proposed Section 6625.1 is confusing and that it contains technical errors.

Response:

The Board and its staff have reviewed the proposed text and have concluded that it is both clear and technically correct. The Board also notes that the April 3, 2012, subcommittee, and the 15-day comment period yielded no additional documentary evidence or basis that would persuade the Board or its staff that a modification of the proposed language as suggested by Mr. Bhalla is necessary.

Comment 3:

Mr. Bhalla requested that the Board re-evaluate the proposed requirement for a 50-foot safety zone around an open well bore or source of flammable vapor of gas. Mr. Bhalla recommended a 100-foot safety zone instead of the 50-foot safety zone for the following three reasons:

- 1) To be consistent with applicable API standards,
- 2) The 50-foot safety zone does not have good scientific basis and increases the hazard to workers significantly. In order to provide the necessary distance to allow the flammable gas to disperse and thus reduce the risk to workers, the safety zone should be 100 feet.
- 3) The increased cost to the industry as the result of the increased safety zone from 50 to 100 feet would be negligible.

Response:

In the response to an earlier similar recommendation by Mr. Bhalla to have the proposed standard be consistent with API standards as a justification for a 100-foot safety zone, the Board states

that the applicable API standards do not mandate a 100-foot safety zone for the operation of diesel engines protected by air intake shut-off valves. The referenced 100-foot safety zone mandate applies to the spark arresters. The API 54 Third Edition, March 2007, Section 9.15 addresses internal combustion engines and addresses emergency shut-down devices for diesel engines. This API recommendation is consistent with a current requirement in Section 6625 that mandates emergency stop devices on prime movers including air-intake shut-off valves for diesel engines for all drilling rigs and well servicing equipment. In addition, Section 6625 requires the emergency stop devices irrespective of distance to the well. Board staff does not believe this comment warrants a change to the proposal.

With regard to Mr. Bhalla's recommendation to provide the necessary distance to allow the flammable gas to disperse and thus reduce the risk to workers, the Board stated in an earlier response to the same recommendation by Mr. Bhalla, that all available national and California oil and gas well site accident data shows that the accidents related to diesel engine operations at well sites occurred within the immediate vicinity of the well bore and well within the proposed 50-foot safety zone. The Board therefore opines the accident data does not support the necessity to increase the radius of the safety zone to 100 feet.

With regard to Mr. Bhalla's conclusion that the additional air intake shutoff device installation cost resulting from increasing the size of safety zone would be negligible, the Board notes that any additional cost that has been shown to be unnecessary is unreasonable and excessive.

The Board also notes that the April 3, 2012, subcommittee, and the 15-day comment period yielded no additional documentary evidence or basis that would persuade the Board or its staff that a modification of the proposed 50-foot safety zone as suggested by Mr. Bhalla is necessary.

Comment No 4:

Mr. Bhalla feels that using gas sensors in place of automatic air-intake shutoff valves is not a good idea because of the limitations of the air monitoring equipment in terms of:

- 1) The slow speed of response to elevated levels of flammable gasses and vapor
- 2) The low confidence in detection accuracy,
- 3) The difficulties with properly maintaining the gas detectors, and
- 4) In order for the proposed standard to be effective, many detectors in numerous locations would be needed.

Response:

The Board disagrees with Mr. Bhalla's opinion that the proposal to rely on gas sensors or gas detection instruments as an administrative control in place of a mandated automatic air-intake shut-off valve is an inappropriate safety measure at oil and gas well sites. The Board notes that the gas detection instruments are a viable means of detecting hazardous levels of gas and vapor in a wide range of industries and work settings. This gas detection technology is currently mandated in numerous safety orders in Title 8 and it has shown that, with the mandated maintenance, calibration and inspection requirements currently in Title 8, it is effective in determining hazardous levels of flammable and hazardous gasses and vapors. The Board, staff

and committee members concur that well site safety would be enhanced by the requirement for continuous air monitoring for flammable gas or vapor at the well bore and other gas and vapor sources, using effective gas detection instruments, and by the requirement to shutdown all well site operations when flammable gas or vapor is detected at or above 10% Lower Explosive Limit (LEL). In addition, during the committee meeting, the reliability of the gas detectors was addressed in detail. No testimony or information was presented that contradicted the committee's conclusion that the gas detection technology is reliable and quick to respond to elevating levels of target gasses and vapor. The Board does not believe these comments warrant a change to the proposal.

Comment No 5:

Mr. Bhalla felt that the proposal to require that the shutdown of all operations when flammable gas or vapor is detected at or above 10% LEL at the well bore or source of gas or vapor is questionable, since diesel engine manufacturers are currently not in a position to confirm at what LEL level a diesel engine can overspeed.

Response:

The Board disagrees with Mr. Bhalla and notes that the intent of the requirement for the lowered alarm set point with the proposed 10% concentration of flammable gas or vapor at the source point of the gas and/or vapor release is not to lower the concentration of gas in the intake air of the diesel engine to prevent runaways, but to provide the employees with added warning and reaction time to shutdown the well site operations and evacuate employees to a safe location before the gas reaches the diesel engine. The Board notes that the proposed alarm set point at 10% LEL has been used by much of the oil and gas production industry for a significant number of years and has found it to be effective in providing the employees with the necessary warning to respond to the gas and vapor releases. Therefore, the Board does not believe this comment warrants a change to the proposal.

The Board thanks Mr. Bhalla for his comment and participation in the Board's rulemaking process.

Mr. James Thomas, Administrative & Regulatory Affairs Manager, Nabors Well Services Co., by letter dated August 20, 2012.

Comment:

Mr. Thomas notes that Nabors Well Services Co. (NWSC), as a provider of workover rigs, drilling rigs and other oilfield services to oil producers, supports the Board and the proposal in an effort to improve the safety at oil and gas well sites. NWSC feels the proposal will provide the employers with reasonable alternative options in controlling runaway diesel engines, and providing the necessary flexibility in their operations and the necessary worksite safety.

Response:

The Board thanks Mr. Thomas for his support and participation in the Board's rulemaking process.

ADDITIONAL DOCUMENTS RELIED UPON

- 1) Meeting Minutes, for the April 3, 2012, Advisory Subcommittee Meeting, convened in Sacramento, California
- 2) Letter dated February 3, 2012, from Annette Hebert, Chief, Mobile Source Operations Division, California Air Resources Board to Marley Hart, Executive Officer, Occupational Safety and Health Standards Board

DOCUMENTS INCORPORATED BY REFERENCE

None.

DETERMINATION OF MANDATE

These standards do not impose a mandate on local agencies or school districts as indicated in the Initial Statement of Reasons.

ALTERNATIVES CONSIDERED

No reasonable alternatives have been identified by the Board or have otherwise been identified and brought to its attention that would be more effective in carrying out the purpose for which the action is proposed, would be as effective and less burdensome to affected private persons than the proposed action, or would be more cost-effective to affected private persons and equally effective in implementing the statutory policy or other provision of law.